

III. NOTES ON ORIENTAL DRAGONFLIES IN THE INDIAN MUSEUM.

No. 4.—THE GENUS *PSEUDAGRION*.

By F. F. LAIDLAW.

Genus *Pseudagrion*, de Selys.

A genus showing the essential features of the dominant section of the Agrioninae both as regards venation and in other respects. It ranges from S. Africa through the tropical regions of the old world to Australia (I can find no record for Ceylon). It is characterized especially by the following characters:—

- (i) Extent of petiolation of the wing This ceases at the level of the basal post-costal nerve; this latter lies at a level between the first and second antenodal nerves.
- (ii) Presence of post-ocular spots, and by certain sexual characters:—
 - (a) Pterostigmata of all four wings of males alike.
 - (b) Shape of superior anal appendages of males.
 - (c) Structure of hind margin of prothorax of female.
 - (d) Absence of a spine on the ventral surface of the eighth abdominal segment of the female.

Morton has published admirable figures of the anal appendages of three species, viz. *P. decorum* (Ramb.), *P. hypermelas*, Selys, and of *P. bidentatum*, Morton (*Trans. Ent. Soc. London*, 1907, pl. xxiv). Tillyard has figured the anal appendages of a male *P. australasiae*, Selys, from Queensland, the base of the wing of the same species, and the prothorax of the female of an allied form *P. aureofrons*, Tillyard, the latter exhibiting the characteristic generic features (*Proc. Linn. Soc. N.S. Wales*, XXXVII, 3, pls. xlviii, xlix). The anal appendages of *P. microcephalum* (Ramb.) have been figured by myself in a recent paper (*Mem. Ind. Mus.*, V, p. 179). In the Museum collection examples of four Indian species are preserved.

I give below a table which will, I hope, be of service in facilitating the recognition of the Indian species.

CHARACTERS OF MALES.

- A. Abdominal segments 1-7 with black or bronze black markings.
 - i. Segments 8, 9, 10 black.
 - a. Thorax black with olive-coloured antehumeral band, superior anal appendage bifurcate in profile, with a single large internal tooth *P. hypermelas*, Selys.

- b. Thorax blue with a black line on either side of carina. Superior anal appendage falcate in profile with a large internal two-pointed tooth ... *P. bidentatum*, Morton.
- ii. Segments 8-9 blue,¹ 10 black dorsally.
 - c. Dorsum of thorax with three narrow black stripes. Superior anal appendages as long as segment 10; marked with white internally ... *P. microcephalum* (Ramb.).
 - d. Dorsum of thorax with three broad black bands. Superior anal appendages only half as long as segment 10 ... *P. australasiae*, Selys.
- iii. Segments 8, 9, 10 blue,¹
 - e. Upper lip and head largely blue, anal border of segment 10 moderately excavate, spines on border very small. Superior anal appendages unequally bifurcate in profile, black above, whitish below; lower pair truncate, much shorter than upper pair ... *P. decorum* (Ramb.).
 - f. Upper lip and head largely orange-brown; anal border of segment 10 deeply excavate, beset with strong black spines. Upper anal appendages not bifurcate in profile. Lower pair nearly as long, pointed ... *P. rubriceps*, Selys.
- B. Abdominal segments all blue except 9, which is black above ... *P. azureum*, Selys.

To supply any key for discrimination between the females of these species is a much more difficult matter.

In the first place the Museum material includes female specimens of two species only, viz. of *P. microcephalum* in some abundance, and a solitary female of *P. decorum*. Secondly the females of *P. hypermelas* and of *P. bidentatum* are quite unknown and thirdly it is evident that characters which can be used for purposes of identification are much harder to find than in the case of the males.

In a general way the female of *P. azureum* can be contrasted with those of the other species that have been described by the absence in it of any black markings on the abdomen, which according to Selys is bluish (bleuâtre) in colour, paler beneath.

The remaining species of which any account is available all have black markings on the abdomen on segments 1-9.

P. microcephalum has the post-ocular spots of a fairly bright blue colour with blue on the thorax. *P. decorum*, which is a rather larger insect, has green post-ocular spots and the ground colour of the thorax is distinctly green. That of *P. australasiae* is also larger than *P. microcephalum* and according to Selys the black marks on segments 8 and 9 are more extensive than in the smaller species.

Lastly *P. rubriceps* is described as having the upper lip of an orange colour, the rest of the head yellowish with blue post-ocular spots, the thorax orange yellow.

¹ The sutures of these segments are ringed with black.

P. australasiae, Selys.

P. australasiae, Kirby, *Cat. Odonata*, p. 183; Tillyard, *Proc. Linn. Soc. N. S. Wales*, XXXVII, 3, p. 469, pl. xlviii, figs. 23-24; pl. xlix, fig. 15.

Range.—India to Australia.

Recorded Stations.—Pulo Besaor (*Selys*), Queensland (*Selys*), Cape York to National Park, N.S.W. (*Tillyard*).

The males of this species are exceedingly like those of *P. microcephalum*. The build is a trifle more robust than in that species, and the three black bands of the thorax are much broader, whilst the black marking on segment 10 of the abdomen is more extensive. Examination of the anal appendages of the males will facilitate the distinction of the two species.

I believe the Calcutta specimens can be further differentiated from Australian forms by the characters of the anal appendages, but have no specimens for comparison. Tillyard, *loc. cit.*, describes the superior anal appendages as having the upper lobe shorter than the lower; in the Calcutta specimens both lobes appear equal in length, whilst the lower appendages in the latter seem to me to be rather more conical and tapering. The specimens are, however, not in the best of condition and study of further material is necessary for a satisfactory determination of possible differences. *A priori* I am inclined to expect the two forms to be moderately distinct.

The Museum collection contains an old specimen of the male labelled by Selys. I have found also a single male from Calcutta, amongst specimens of *Ischnura senegalensis*.

Approximate dimensions :

♂ abdomen 31-32 mm., hind-wing 21 mm.
♀ ,, 29-30 mm., ,, 21 mm.

P. microcephalum (Ramber).

P. microcephalum, Kirby, *Cat. Odonata*, p. 153; Selys, *Ann. Mus. Genova*, (2) X, p. 83 (1891); Martin, *Mission Pavie* (sep.), p. 18; Ris, *Archiv. f. Naturgesch.*, 1900, p. 198.

Range.—India, Burma, Tonkin, Malaya to the Bismark Archipelago.

I have recently dealt with this species in an account of Odonata found about Lake Chilka in Orissa (*Mem. Ind. Mus.*, V, p 178, 1915). In the accompanying diagrammatic text-figure I show the colour pattern of the thorax of the female viewed from above. The dotted areas are brown in colour, the unshaded spaces blue. The immature male has the same colouring; in mature males the brown is entirely replaced by black on the three stripes.

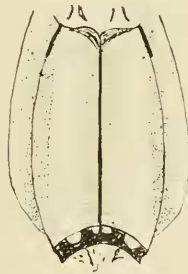


FIG. 1.—Dorsum of thorax of *P. microcephalum* ♀.

P. microcephalum is evidently one of the commonest of dragonflies in the low-lying parts of Bengal.

Approximate dimensions:

♂ abdomen 27-29 mm., hind-wing 17-18 mm.
♀ „ 27-28 mm., „ 18-19 mm.

P. decorum (Ramb.).

P. decorum, Kirby, *Cat. Odonata*, p. 153; Kruger, *Stettin Ent., Zeit.*, 1898, p. 119; Morton, *Trans. Ent. Soc. London*, 1907, p. 307, pl. xxiv, figs. 7, 8.

2 ♂♂ Calcutta, 4-i-15 ($\frac{83.3}{20}$).

1 ♂ Calcutta ($\frac{83.2}{1}$). Labelled by de Selys.

1 ♂ Sar Lake, Puri District, Orissa, 9-iv-15 ($\frac{11.6}{11.1}$).

Range:—Peninsular India, Sumatra.

Recorded Stations:—Bombay (Rambur), Deesa (Morton), Soekranda, Sumatra (Kruger).

The adult male closely resembles the newly-emerged male of the closely allied *P. microcephalum* in colour, so far as the thoracic pattern is concerned.

Approximate dimensions:

♂ abdomen 28-30 mm., hind-wing 19 mm.
♀ „ 25-27 mm., „ 18 mm.

P. rubriceps, Selys.

P. rubriceps, Kirby, *Cat. Odonata*, p. 183; Selys, *Ann. Mus. Genova*, (2) X, p. 83 (1891).

1 ♂ imature, with larval skin. Museum Tank, Calcutta ($\frac{66.0}{20.7}$).

Range:—India, Burma, Java.

Recorded Stations:—Palon (Selys), “India” (Selys), “Java” (Selys).

The specimen was preserved shortly after emerging, consequently it is not possible to make any examination of the wing characters.

Fortunately the anal appendages are well shown. The colouring of the thorax resembles closely that of an immature *P. decorum*. In general the insect both as regards colour and the structure of the anal appendages is a typical *Pseudagrion*. Segments 9-10 of the abdomen are (apparently) blue; 8 would appear to have a longitudinal bronze band dorsally, narrowing in front. The upper pair of anal appendages are tinged with brown, the lower pair are white. The curious series of spines developed along the border of the excavation of segment 10 are black (see text-fig 2).

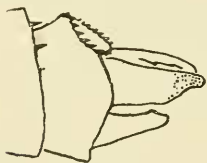


FIG. 2.—Apex of abdomen of *P. rubriceps* seen from the side obliquely.

Selys' accounts of the colouring of the abdomen are contradictory. In the synopsis he states that segment 10 is black

above ; in the "*Odonates de Birmanie*" that segments 8-10 are light blue. The present specimen is too young to show colours satisfactorily, but so far as one can judge segment 10 is blue.

The larval skin, which is lacking the gill lamellae, shows a close general resemblance to that of *P. microcephalum* described by me.

Approximate dimensions :

♂ abdomen 29 mm., hind-wing 18-20 mm.

♀ ,, 27-29 mm., ,, 19-20 mm.

***P. bidentatum*, Morton.**

P. bidentatum, Morton, *Trans. Ent. Soc. London*, 1907, p. 308, pl. xxiv, figs. 11-12.

Recorded Stations :—Deesa, Gujerat.

Dimensions : ♂ abdomen 23.75 mm., hind-wing 16.5 mm.

***P. hypermelas*, Selys.**

P. hypermelas, Kirby, *Cat. Odonata*, p. 183 ; Kruger, *Stettin Ent. Zeit.*, 1898, p. 119 ; Morton, *Trans. Ent. Soc. London*, 1907, p. 307, pl. xxiv, figs. 9-10.

Range :—India, Sumatra.

Recorded Stations :—Deesa (*Morton*), Sambong, Sumatra (*Krug r*).

Approximate dimensions : ♂ abdomen 15-18 mm., hind-wing 24-26 mm.

***P. azureum*, Selys.**

P. azureum, Selys, *Ann. Mus. Genova*, (2) X, pp. 81-83 (1891).

Range :—Burma.

Recorded Stations :—Karin Hills in June ; Cobapo in September (*Selys*).

Dimensions : ♂ abdomen 30-36 mm., hind-wing 21-23 mm.

♀ ,, 36 mm , ,, 23 mm.

